

MULTIMEDIA



UNIVERSITY

STUDENT ID NO

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MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2018/2019

ECP2046 – COMPUTER ORGANIZATION AND ARCHITECTURE (TE, RE)

11 MARCH 2019
9.00 a.m – 11.00 a.m
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of 2 pages excluding cover page with 4 questions only.
2. Attempt ALL 4 questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please write all your answers in the answer booklet provided

QUESTION 1

a) List and describe any five key services provided by an operation system. [10 marks]

b) Below are the five memory management techniques. Describe each technique and state their strengths and weaknesses

- i) Fixed partitioning
- ii) Dynamic partitioning
- iii) Simple paging
- iv) Simple segmentation
- v) Virtual memory paging

[15 marks]

QUESTION 2

a) Convert the following numbers in decimal representation to two's complement representation with length of 8 bits

- i) 7_{10}
- ii) -4_{10}
- iii) -128_{10}

[6 marks]

b) Calculate the following floating-point arithmetic in binary form and store in IEEE 32-bit floating-point format:

$$36.25_{10} + 0.6875_{10}$$

[5 marks]

c) Calculate $-3_{10} \times 7_{10}$ using Booth algorithm

[14 marks]

Continued ...

QUESTION 3

a) State all the types of addressing modes and draw a diagram for each to illustrate them. [19 marks]

b) Compare *horizontal micro-instruction* and *vertical micro-instruction* in terms of microprogramming. [6 marks]

QUESTION 4

a) By using a timing diagram, evaluate the improvement the superpipeling and superscalar machines attain compared to a pipelining machine, when executing a six four-stage instructions. Assume a degree of 2 for both the superpipeling and superscalar machines. [11 marks]

b) List and briefly explain the five limitations to superscalar architecture. [10 marks]

c) Refer to the instruction below:

Instruction 1 : $R1 = R1 + R6;$

Instruction 2 : $R4 = R1 + 2;$

Instruction 3 : $R2 = R9 + 5;$

Instruction 4 : $R9 = R2 + 1;$

Instruction 5 : $R2 = R8 + 3;$

Identify the type of dependency between the following instructions. Justify your answer.

i) Instruction 1 and 2 [2 marks]

ii) Instruction 3 and 5 [2 marks]

End of Paper